



MANUAL

RESIDENTIAL FIRE PUMP CONTROLLER

MODEL RFP
(Simplex and Duplex)

TABLE OF CONTENTS

PART I	GENERAL DESCRIPTION	PAGE 2
PART II	FUNCTIONS	PAGE 2
PART III	INSTALLATION	PAGE 2
PART IV	INITIAL INSTALLATION START-UP PROCEDURE	PAGE 2
PART V	OPERATION OF CONTROLLER	PAGE 3
PART VI	SEQUENCE OF OPERATION	PAGE 3
PART VII	PRESSURE SWITCH ADJUSTMENT	PAGE 5
PART VIII	NOMENCLATURE	PAGE 6

METRON, INC.
1505 West Third Avenue
Denver, Colorado 80223

Telephone: (303) 592-1903 Fax: (303) 534-1947
www.metroninc.com

Metron, Inc.	Date: <u>4/23/02</u>	Approved: _____	DOC#: <u>574</u>
Revision: <u> </u>	Date: _____	Approved: <u>SH</u>	Page: <u>1 of 6</u>

PART I: GENERAL DESCRIPTION

The basic function of the Residential Fire Pump Controller is to start the pump motor(s) to restore pressure in the fire protection system. This may be accomplished by automatically starting the pump motor(s) upon drop in pressure in the water system. It can be set to stop automatically or require manual stop after an automatic start. The controller can be started by remote manual means but cannot be stopped remotely.

PART II: FUNCTIONS

A. Automatic Starting From:

Drop in water line pressure

B. Alarms and Signals:

1. **Remote indication of pump operation:** One (1) set of normally open (N.O.) and normally closed (N.C.) contacts located in the controller operates when the pump(s) is running.
2. **Loss of power to the controller:** One (1) Single Pole Double Throw (SPDT) contact located in the controller operates for loss of power, loss of phase, or low voltage.
3. **Power On pilot light on controller:** This light is on whenever the circuit breaker of the controller is closed indicating that power is available and the controller is set for operation.

C. Principle Components of Controller:

1. Circuit breaker
2. Contactor(s)
3. Pressure Switch

The incoming line is connected to the power distribution block. From there power is fed to the circuit breaker(s). The circuit breaker(s) should be always closed. The contactor is operated either manually or automatically to start the motor.

PART III: INSTALLATION

The Fire Pump Controller has been assembled and wired at the factory with the highest workmanship standards. All wiring and functions have been thoroughly tested to assure correct operation when properly installed. Before operating the controller perform the Initial Installation Startup Procedure, Part IV.

The cabinet should be well grounded according to local standards. Make sure that all applicable external control wires are connected to appropriate terminals as shown in Schematic drawing. Failure to make the proper connections will cause the controller to malfunction. Connection from the contactor to the motor(s) may be done after the test procedure is completed. The contact ratings of the remote alarm signal circuits of the controller are shown in Schematic drawing. Do not exceed ten (10) amperes, 250 volts on these circuits. After installation has been completed, perform the Initial Installation Start-Up procedure, Part IV before operating the controller.

PART IV: INITIAL INSTALLATION START-UP PROCEDURE

- A. **General:** All but the final functional test can be made with the motor(s) disconnected. This will eliminate the need for starting and stopping the motor several times during the test procedure. If the output connections from the contactor(s) to the motor(s) were made on initial installation, disconnect them for the first part of the Initial Installation Start-Up Procedure. Refer to Schematic drawing for nomenclature of all controls.

The controls and their functions are follows:

1. **Circuit Breaker(s):** The circuit breaker(s) is located ahead of the motor contactor(s). Its function is to protect the line from damage due to a short in the load.
2. **Emergency Start Lever(s):** This control is used to start the fire pump(s) in case of any malfunction within the control circuits.

3. **Start Button:** This pushbutton starts the pump motor(s) by energizing the contactor coil circuit, thereby connecting the power to the pump motor(s).
4. **Stop Button:** This pushbutton stops the pump motor(s) by opening the contactor coil circuit, thereby disconnecting the current to the pump motor.

B. Initial Start-Up:

1. Close circuit breaker and measure voltage at the line terminals of motor contactor(s). Voltage should be the same as the incoming line voltage. The Power On pilot light on controller should be on.
2. Push start button, motor contactor should close. Measure voltage at output of contactor. It should be the same as the incoming line voltage. In a duplex pump controller, there will be a short time delay and the second motor contactor should close.
3. Push stop button, motor contactor(s) should be open.
4. Drop the water pressure at water inlet to controller so the pressure switch will close, the motor contactor(s) should close. Allow water pressure to return to normal. If controller is set for automatic stop, set the running period timer for at least 10 minutes. The motor contactor(s) should open after this time period. If controller is set for manual stop, push stop button, motor contactor(s) should open.
5. Turn circuit breaker off.
6. Connect output from contactor to pump motor(s).
7. Close circuit breaker(s).
8. Push start button, motor(s) should start. Check for proper rotation of the motor(s).
10. Push stop button, the motor(s) should stop.

PART V: OPERATION OF CONTROLLER

After the installation and test procedures are completed, the controller is ready for normal operation. The circuit breaker(s) should be closed. For controllers set for automatic stop, set the running period timer for at least 10 minutes. Emergency manual operation is provided in case of failure of control circuitry. This lever is manually moved to the "Engaged" position and must be manually latched or it will return to "Disengaged" position when released. The lever should be moved to the "Engaged" position in quickly a motion as possible to prevent burning the contacts. The circuit breaker should be turned off to disconnect power before releasing the emergency lever. This lever is for emergency use only.

PART VI: SEQUENCE OF OPERATION

- A. Introduction:** The explanation of the sequence of operation will start with the assumption that the controller has been properly installed, all external connections have been made and the circuit breaker is closed. In other words, the controller is operational. The Power On pilot light should be on.
- B. Manual Operation:** For manual operation there is a start button switch on the controller and terminals for an optional remote start switch located elsewhere. These switches have normally open contacts which close to energize 1CR and 1MC. 1CR locks in on its own N.O. contact and stays energized until the stop button is depressed. When the pump is running a green pilot lamp will illuminate in the start switch and the audible alarm will sound. In a duplex controller, after a short time delay, as set on timer 2TR, the second motor will start when 2TR times out and its N.O. contacts

close and energize 2MC.

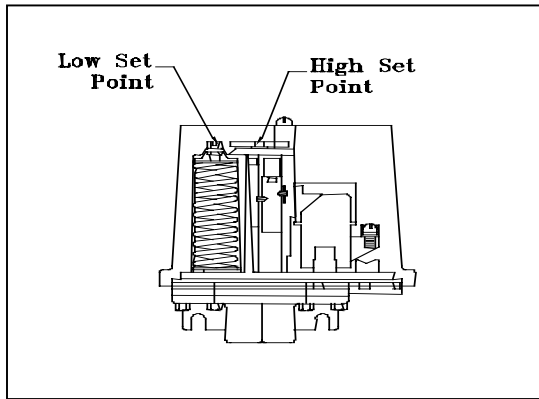
To stop the motor(s) manually, the stop pushbutton is depressed. This breaks the circuit to the coils of 1CR and 1MC and they are de-energized, the circuit opens and de-energizes the motor contactor(s) and stops the motor(s). A red pilot light is provided in the stop pushbutton to indicate that the pumps are not running.

- C. Automatic Operation / (Pressure Switch):** On drop of water pressure the N.O. contact in the pressure switch closes energizing the coil of 1MC. 1MC locks in through its N.O. contact and a N.C. contact of 1TR. In a duplex controller, after a short time delay, as set on timer 2TR, the second motor will then start as described in B above.

On controllers set for automatic stop, a running period timer, 1TR is used to keep the motor running for a preset time period regardless of whether the contact of the pressure switch has opened. On a controller set for manual stop only, a jumper is installed between terminals 11 and 12 that will energize relay 1CR which locks in through its own N.O. contacts. The controller must be stopped with the manual stop push button that breaks the circuit to 1CR and 1MC.

- E. Remote / Pump Running Signal:** One (1) N.O. and one (1) N.C. contact is available for remote indication that the pump is running. In a duplex controller, an additional set of Pump Running contacts, one N.O. and one N.C. is provided for remote indication of Pump 2 running.
- F. Remote / Loss of Power, Loss of Phase, Low Voltage:** One (1) SPDT contact is available for remote indication of loss of line power, loss of phase, or low voltage.

PART VII: PRESSURE SWITCH ADJUSTMENT



The pressure switch for automatic starting of the fire pump is located on exterior of the enclosure on the left side. Loosen the knurled nut on the top of the clear plastic cover and remove the cover.

The Alco pressure switch has two adjustable set points. There is attached to one of the setting screws a black plastic "star wheel" to aid in the adjustment of the set points. The star wheel may be moved from one setting screw to the other if necessary. A flat blade screw driver may also be used to adjust the set points. The upper (or high) set point is the pressure at which the pressure switch will reset and the contacts will open and allow the

pump to stop. Using the setting screw on the right side adjust the red pointer to the desired stop pressure. The stop pressure is normally set at a pressure less than the "churn" pressure of the pump (including minimum suction pressure). If this pressure is set too high the pressure switch will never reset and the pump will never stop. The lower set point is the pressure at which the switch contacts will close and the controller will start the pump. Using the setting screw on the left side above the spring adjust the green pointer to indicate the desired start pressure. *Note that adjusting the low set point will not have any affect on the high set point, but the high set point will have an effect on the low set point. If the high set point is lowered the low set point will be also lowered. It will be necessary to go back and readjust the low set point if the high set point is changed.*

Verify the pressure settings by reducing the pressure in the sensing line to the controller until the pump starts and read the pressure on a separate pressure gauge. After the pump starts and the pressure in the system rises note the pressure at which the Alco resets. It may be necessary to readjust the pressure switch to obtain the exact pressures desired. Replace the plastic cover and secure the knurled nut on top of the unit.

PART VIII: NOMENCLATURE

1CR	Manual Start Control Relay
2CR	Power Available Relay
3CR	Power Available, Pump 2 (Duplex only)
1TR	Run Period Timer
1MC	Motor Contactor
2MC	Motor Contactor, Pump 2 (Duplex only)
1MCA	Motor Contactor Auxiliary Contacts
2MCA	Motor Contactor Auxiliary Contacts, Pump 2 (Duplex Only)
1CS	Stop Switch
2CS	Start Switch
1PL	Power ON Pilot Light
2PL	Pump(s) Running Pilot Light
3PL	Pump(s) Stopped Pilot Light
1CB	Circuit Breaker
2CB	Circuit Breaker, Pump 2 (Duplex only)
1PS	Pressure Switch